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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,097	03/26/2001	Stepan Sokolov	SUN1P815/P5613	2836

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EXAMINER

STEELMAN, MARY J

ART UNIT PAPER NUMBER

2122

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/818,097	SOKOLOV ET AL.	
	Examiner	Art Unit	
	Mary J. Steelman	2122	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to Amendment dated 5 May 2004. Claims 1, 7, 15, and 19 have been amended. Claim 2 has been canceled. Claims 1, 3-21 are pending.

Drawings

2. In view of the amendment to Fig. 1, the prior objection is hereby withdrawn.

Specification

3. In view of the amendments to the Specification, the prior objections are hereby withdrawn.

Claim Objections

4. Claim 15, line 11, recites, "...said information directly form said class...", should be -- ...said information directly from said class...-- Change 'form' to 'from'.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1 and 19 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for loading select information into a virtual machine, does not reasonably provide enablement for "loading said selected information directly from said memory..." The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

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How does one directly load? Via a bus? This application requires some selection process involved prior to loading. Applicant has attempted to amend the claims to distinguish from Merrick, US Patent 6,339,841, col. 1, lines 39-46, "...a method of processing a class file...creating separate components...storing the components so that each component of the class is individually identifiable and accessible...loading...only the components needed..." It is unclear to as to why the word 'directly' is an added limitation. It is apparent that Applicant attaches special meaning to the word. It is unclear to Examiner how selected information is directly loaded.

7. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for "selecting said information from a class file", does not reasonably provide enablement for "selecting said information directly from said class file". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. Again, it is not clear to Examiner the method or value of "directly" selecting.

8. Claims 1 and 19 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for "loading said class file in its entirety", does not reasonably provide enablement for "loading said class file in its entirety without processing said class file..." The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

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Is it not true that "loading class files" is in fact "processing class files"? It is not clear to Examiner how class files can be loaded, but not processed. Perhaps Applicant intends to "load said class file in its entirety, prior to processing for a selection criteria?"

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 9, 17 and 20 are rejected under 35 U.S.C. 112, second paragraph.

10. The term "is likely to be used" in claims 3 & 20 is a relative term, which renders the claim indefinite. The term "is likely to be used" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

11. The term "appropriate information", used twice in claims 9 and 17 is a relative term, which renders the claim indefinite. The term "appropriate information" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

On page 8, 4th paragraph, Applicant argues, "...information that is likely to be used over a pre-determined threshold...can be used. One skilled in the art would also appreciate that the pre-determined threshold can be based on several other factors including system requirements (e.g. speed, memory). Examiner disagrees with Applicant's point of view. Specification does not define a standard for ascertaining the requisite degree. Thus, one of ordinary skill in the art would not be reasonably apprise of the scope of the invention.

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On page 8, 4th paragraph, Applicant argues, "one skilled in the art would know that populating a component generally operates to provide the appropriate information for the component." Examiner disagrees. The phrase "appropriate information" is not clearly defined in the Specification and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1, 3-12, 15, 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent 6,738,977 B1 to Berry et al., in view of 6,339,841 to Merrick et al.

Per claims 1 and 19:

Berry disclosed:

-method / computer readable media

(Berry: col. 2, line 40, "...provides a method...", col. 4, lines 55, "provides a computer program product...instructions typically recorded onto a storage medium (computer readable media)...")

-loading said class file into a memory portion of the computing system, wherein said loading operates to load said class file in its entirety without processing said class file;

(Berry: Abstract, lines 2-3, "A class file is loaded by the first virtual machine into shared memory...")

Berry disclosed a relationship between multiple virtual machines. Classes are loaded into the heap memory of a master virtual machine. Col. 2, lines 58-67, "The invention provides a master (first) virtual machine and at least one client (second) virtual machine running in parallel on the same computer system...certain class properties...may need to be set individually on each virtual machine." Thus Berry provides motivation for a "special version" of the class to be loaded onto the client / second virtual machine. Berry disclosed (col. 11, lines 26-33), "...the requirement to mirror all of the method block is platform dependent..." Thus Berry suggested that the second virtual machine may load only a portion of the class.

Merrick provided additional information regarding the selection of information that is to be loaded into the virtual machine. Merrick disclosed:

- selecting information from said class file after said class file has been loaded into said memory portion, wherein said selecting operates to select information that is to be loaded into said virtual machine;

(Merrick disclosed that the class file could be partitioned to allow for dependent methods to be grouped together (selected) for loading. Col. 3, lines 51-54, "Other ways of breaking down a class file are possible, for instance one could group some methods together if they were dependent on one another.")

- loading said selected information directly from said memory portion into said virtual machine and not loading information which has not been selected from said class file into said virtual machine.

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(Merrick: Col. 4, lines 33-37, "...the modified class loader will be asked to load x.class (step 1) (loading said selected information). Instead of downloading the x.class in its entirety (not loading information which has not been selected)..." Merrick suggests that only the requested information is loaded. Col. 4, lines 22-27, "...a load method invoker (modified class loader) to retrieve the method component that has not been loaded onto the client..." and col. 4, lines 64-65, "The method byte code is written to the location pointed at by the invoker...")

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claims 3, 4, 20 and 21:

-selecting of information operates to select information from said class file that is likely / needed to be used by the virtual machine. (Merrick: Col. 3, lines 57-59, "The class loader would check for 'compulsory methods' (likely / needed to be used) in the metadata...and load those methods referenced." Also, col. 5, lines 16-17, "...one of the methods within the class was referenced then only the block of data representing this method is loaded...along with the other essential components of the class.")

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claim 5:

- selecting of information operates to select information that includes information associated with at least one method of said class. (Merrick: Col. 5, lines 18-19, "...along with other essential components of the class.")

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claim 6:

-loading of only said selected information operates to create an internal representation of the class file in the virtual machine. (Merrick: See fig. 2. Client holds and internal representation of the class file.)

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Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claim 7:

-said internal representation of said class file includes a method reference portion for said selected information, wherein said method reference portion includes one or more references cells which provide information associated with one or more methods which have been selected to be loaded into said virtual machine.

(Merrick: See fig. 2, #26, Method Table. Col. 3, lines 62-64, "During the class loading the client receives the linear sequence of bytes codes (method code field) and reconstructs the class structure." Also, col. 4, line 10-12, "The method table comprises the names of the methods used by the class and links to the methods or method invokers for that method." The method invoker has signature field.)

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the

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purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claim 8:

-said method reference portion includes a method name field, a method signature field, and a method code field.

(Merrick: col. 4, line 10-12, "The method table comprises the names of the methods used by the class and links to the methods or method invokers for that method." The method invoker has a signature field.)

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claims 9 and 17:

-said loading of only said selected information operates to populate said method name field, method signature field, and method code field with appropriate information or references to appropriate information.

(Merrick: See fig. 2, #26. Col. 3, lines 62-64, "During the class loading the client receives the linear sequence of bytes codes (method code field) and reconstructs the class structure." Also,

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col. 4, line 10-12, "The method table comprises the names of the methods used by the class and links to the methods or method invokers for that method." The method invoker has signature field.)

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claim 10:

-memory is a heap memory of said computing system.

(Berry: Berry's invention disclosed loading code into a first (master) virtual machine. As such the memory is a heap memory. See FIG. 4, #245, Private Heap.)

Per claims 11 and 12:

-determining whether an internal representation of the class file exists in the virtual machine;
-creating an internal representation of the class file in the virtual machine when said determining determines that an internal representation of the class file does not exist in the virtual machine.

(Berry: Col. 3, lines 66-col. 4, line 12, "...a shared class is loaded into the second virtual machine by walking the class loader hierarchy...to determine for each class loader in the hierarchy whether it has previously loaded the class (determining whether an internal

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representation of the class file exists). This determination is performed...on the basis of said class loader cache...If the class has not been previously loaded...it is then determined whether the class has been loaded ...the client causes the class to be loaded (create an internal representation)” It is determined whether an internal representation of the class file exists else it is created.)

Per claim 15:

Berry disclosed a relationship between multiple virtual machines. Classes are loaded into the heap memory of a master virtual machine. Col. 2, lines 58-67, “The invention provides a master (first) virtual machine and at least one client (second) virtual machine running in parallel on the same computer system...certain class properties...may need to be set individually on each virtual machine.” Thus Berry provides motivation for a “special version” of the class to be loaded onto the client / second virtual machine. Berry disclosed (col. 11, lines 26-33), “...the requirement to mirror all of the method block is platform dependent...” Thus Berry suggested that the second virtual machine may load only a portion of the class. Berry disclosed:

-A method of loading a class file into a virtual machine, said class file being associated with a class, and said virtual machine operating in a computing system, said method comprising:
(Berry: col. 2, line 40, “...provides a method...” Also see FIG. 4. Abstract, lines 2-3, “A class file is loaded by the first virtual machine into shared memory...”)

-determining whether said class file exists in a dedicated heap memory portion;

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(Berry: Col. 6, lines 22-27, "For each class included within or referenced by a program, the JVM effectively walks up the class loaded hierarchy...to see if any class loader has previously loaded the class(determines whether said class file exists).")

-loading said class file in its entirety into said dedicated heap memory portion when said determining determines that said class file does not exist in said dedicated heap memory portion;

(Berry: Col. 6, lines 27-35, "If the response from all three class loaders is negative, the JVM walks back down the hierarchy, with the Primordial class loader first attempting to locate the class...the Extension class loader then make a similar attempt...Application class loader then tries to load the class...")

-determining whether an internal representation of said selected information exists in said virtual machine;

(Berry: Col. 3, lines 66-col. 4, line 8, "...a shared class is loaded into the second virtual machine by walking the class loader hierarchy...to determine for each class loader in the hierarchy whether it has previously loaded the class. This determination is performed...on the basis of said class loader cache...If the class has not been previously loaded...it is then determined whether the class has been loaded ..." It is determined whether an internal representation of the class file exists else it is created.)

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-creating an internal representation of said selected information in said virtual machine when said determining determines that an internal representation of said selected information of said class file does not exist in said virtual machine;

(Berry: Col. 6, lines 22-33, "For each class included within or referenced by a program, the JVM effectively walks up the class loader...attempting to locate the class...tries to load the class..." The virtual machine will attempt to load (create an internal representation) if it does not exist.

Merrick provided additional information regarding the selection of information that is to be loaded into the virtual machine. Merrick disclosed:

-encountering a request to use at least one method of a class associated with a class file;

(Merrick: Col. 3, lines 5459, "...group the methods together if they were dependent on one another. This could be indicated in the class metadata where the 'compulsory methods' for downloading were referenced. The classloader would check for 'compulsory methods' in the metadata..." Also, col. 5, lines 16-17, "...one of the methods within the class was referenced then only the block of data representing this method is loaded...along with the other essential components of the class." Dependent methods (methods that request another method) can be grouped together.)

-loading into said virtual machine said selected information associated with said at least one method of said class and not loading into said virtual machine information that was not selected.

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(Merrick: Col. 4, lines 33-37, "...the modified class loader will be asked to load x.class (step 1) (loading said selected information). Instead of downloading the x.class in its entirety (not loading information which has not been selected)..." Merrick suggests that only the requested information is loaded. Col. 4, lines 22-27, "...a load method invoker (modified class loader) to retrieve the method component that has not been loaded onto the client..." and col. 4, lines 64-65, "The method byte code is written to the location pointed at by the invoker...")

-selecting information associated with said at least one method of said class, wherein said selecting operates to select said information directly from said class file;

(Merrick disclosed that the class file could be partitioned to allow for dependent methods to be grouped together for loading. Col. 3, lines 51-54, "Other ways of breaking down a class file are possible, for instance one could group some methods together if they were dependent on one another.")

Therefore, it would have been obvious, to one of ordinary skill in the art, to have modified Berry's invention, to include the selection of information for a selective load of class files into a virtual machine, as further detailed by Merrick, because both references pertain to virtual machine loading of classes, and both disclose a modified load of class code for the purpose of a quicker virtual machine start up. Berry, col. 11, lines 40-41. Merrick, col. 1, lines 31-35, "Time is also saved as only the classes that are needed are loaded..."

Per claim 18:

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-wherein said internal representation includes a reference cell associated with said at least one method.

(Berry: Col. 6, line 65- col. 7, line 12, "The class storage area further includes a method block area, which is used to store information relating to the code, such as invokers, and a pointer to the code, which may for example be in method code area...Classes stored as objects in the heap contain a reference to their associated data such as method byte code etc. in class storage area..."

The internal representation includes references to associated methods.)

14. Claims 13, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,738,977 to Berry et al., in view of US Patent 6,339,841 to Merrick et al., and further in view of "EJVM: an economic JAVA run-time environment of embedded devices", by Da-Wei Chang and Ruei-Chuan Chang.

Berry disclosed a class loader that loaded from a heap memory area. Berry suggested that the class could be modified for the subsequent loading. Merrick disclosed a modified class loader that loaded only selected information into a virtual machine. While Berry disclosed garbage collection, the combination failed to disclose information regarding removing class files from a memory portion using a Least Recently Used policy.

However, Chang and Chang disclosed "removing said class file / on a Least Recently Used basis /from said memory portion" on pages 140-143. Garbage collection is a well known feature of virtual machines. Using the Least Recently Used policy for determining which code segments to remove is a reasonable technique. It is well known in the art as criteria for choosing

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selected information. Chang and Chang split class files and installed them into a cache. They benchmarked the LRU policy for various sized caches. See fig. 11, page 142.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to have modified Berry's and Merrick's combined invention to also address garbage collection policies, including LRU, because virtual machine efficiency can be enhanced by minimizing memory requirements, and selecting and clearing unused code is a well known technique.

Response to Arguments

15. Applicant's arguments with respect to claims 1 and 3-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (703) 305-4564. The examiner can normally be reached Monday through Thursday, from 7:00 A.M. to 5:30 P.M. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on (703) 305-4552.

The fax phone number is (703) 872-9306 for regular communications for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Mary Steelman



06/30/2004



ANTHONY NGUYEN-BA
PRIMARY EXAMINER